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PERMANENT
FRUIT AND VEGETABLE
GARDENS



THE GROWING of small fruits and permanent vegetables in home gardens provides a greater variety of food. About 90 out of every 100 farms in the United States have upon them some form of a home garden or source of supply of fresh vegetables. Many of these gardens include, in addition to the annual vegetables, small fruits and certain of the perennial or more or less permanent vegetables.

Thousands of city, town, and village gardens also include small fruits, asparagus, rhubarb, and other permanent crops.

This bulletin gives brief instructions for the planting and care of the more important small fruits and perennial vegetables. More complete information may be found in the special bulletins of the United States Department of Agriculture and of the State agricultural colleges and experiment stations.

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PERMANENT FRUIT AND VEGETABLE GARDENS

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PERENNIAL GARDEN CROPS

A HOME GARDEN is incomplete unless it includes some of the more permanent vegetables and small fruits in addition to the regular annual vegetables that are usually planted. A bed of asparagus, several hills of rhubarb, a few plants of horseradish, strawberries, raspberries, blackberries, dewberries, Logan blackberries, grapes, currants, and gooseberries, according to locality and available space, are valuable additions to the home garden. All of these might not thrive in any one locality or on one type of soil, and care must be exercised in making the selection.

The products of the small fruits and the permanent vegetables of the garden are many and add very greatly to the variety of food. Rhubarb pie and sauce have just the right tartness and flavor that one craves during the first days of spring. Later on, when strawberries are plentiful, a little of the rhubarb canned with the strawberries adds the most delicious flavor and tartness to the berries. Currants are considered one of the most desirable fruits for jelly making, and when thoroughly ripened they make an excellent sauce and dessert, especially if mixed with raspberries. Jellies, jams, and marmalades in plenty can be made from raspberries, dewberries, and blackberries, to say nothing of the juices and various products that may be made from grapes. By having a collection of the different small fruits that are adapted to the region one can enjoy a continuous supply of good things to eat throughout the greater part of the summer and in addition have an abundance of preserves for winter use.

There should be a great revival in the planting of small fruits and grapes in connection with home gardens, especially in sections where home orchards are dying out or new ones are not being planted. The

care of small fruits as regards spraying and other requirements is more simple than that of the orchard fruits, and the small fruits can be grown on a much more limited space.

When space is available a section of the garden may be set aside for the permanent vegetables and the small fruits. The location of these permanent crops, however, should be such that they will not interfere with the plowing of the garden or the cultivation of the annual vegetables. In no case should the small fruits be crowded, it being best to plant a limited number, selecting those best adapted to the region. In small gardens the asparagus bed may be placed in one corner or in an offset at the end of the garden, and the hills of rhubarb along the side fence, where they will be out of the way of general cultivation. Sometimes the rhubarb or asparagus is arranged in a sort of row or narrow bed across the front of the garden, separating the garden proper from the lawn at the rear of the house. In large gardens everything should be planted in straight rows in order to facilitate cultivation. Blackberries and dewberries can often be trained upon a fence, and grapes can be grown on an arbor over the garden walk.

Climatic and soil conditions restrict the planting of some of the vegetables and a number of the small fruits to prescribed localities. For example, rhubarb does best in those parts of the country where the ground freezes to a depth of 4 inches or more during the winter.

Generally speaking, raspberries will not stand very hot or dry weather. Blackberries can endure hot weather, but not hot drying winds. Dewberries are grown mostly in the warmer parts of the country. In very cold sections the plants of these fruits should receive some kind of winter protection. Logan blackberries are grown mainly in the Pacific Coast States. Currants and gooseberries do best in a cool climate, but can stand fairly warm summers if they have plenty of water. It is not permissible to plant currants and gooseberries in sections where the white pine is grown, because these plants harbor the blister rust, which is destructive to white-pine trees. There are varieties of grapes for every section where any other fruits are grown. Strawberries will grow practically everywhere.

PERENNIAL VEGETABLES

ASPARAGUS

Plenty of asparagus for a family of six can be grown on a plot of ground no larger than 12 or 16 feet square, provided the soil is well enriched and the plants are given good attention.

Success with asparagus depends largely upon the proper preparation and planting of the bed and upon keeping the soil in which the plants are grown in a high state of fertility by frequent applications of fertilizer or manure. In view of the fact that asparagus plants are long lived, producing for many years, the bed should be located where it will interfere as little as possible with other garden operations. Asparagus requires a type of cultivation different from that given the annual vegetables, in that only the surface of the ground and the space between the plants can be worked.

Asparagus roots go deep into the soil for their supply of plant food and moisture, and for that reason the plants should be set only upon soil that is deep, friable, and fertile. Before setting the plants the upper 10 or 12 inches of soil should be dug or plowed out of the trench and then about 3 inches of well-rotted manure spaded into the lower strata of soil to a further depth of 6 or 8 inches. The trenches should be 3 feet apart and the surface soil piled in ridges between the trenches. Then, after the plants are set and slightly covered, the remainder of the surface soil should be worked in around the plants as they grow. It matters very little as to the kind of manure, so it is reasonably free from straw or other coarse material; however, a partially rotted mixture of cow and horse manure will generally give the best results. Bonemeal, at the rate of 1 pound to 4 yards of trench, should be mixed with the upper 8 inches of soil.

Asparagus plants are started from seed; but one year is required to grow the plants, and it is usually best to purchase strong 1-year-old plants from some nurseryman. The plants or crowns are set during the late autumn or early spring, while they are in a dormant condition. They should be set 24 inches apart in the trenches. The crown of the plant should be 4 to 5 inches below the surface, and the roots well spread out, as shown in Figure 1, and fine soil worked in between them. The plants should be "checked," i. e., set in straight lines in both directions, so that they may be easily cultivated. Do not allow the plants to dry out before setting them.

No shoots should be cut from the plants until the year after setting the bed, and even then cutting should continue for only a very short period. After the second year the bed may be cut for the full season of five or six weeks. The bed should reach its maximum production about the seventh year and, if properly cared for, continue in prime condition for 18 or 19 years. Cases are known where asparagus beds have been in use for more than 30 years and still gave excellent results.

VARIETIES

There are but six or seven varieties of asparagus in general use, the Palmetto, Conover Colossal, and Argenteuil being among those most generally planted in the past. Recently three new varieties known as Washington, Martha Washington, and Mary Washington, all of which are of superior vigor and disease resistance, have been introduced. Of these the Mary Washington is now being most widely planted. Much depends upon securing strong, healthy, 1-year-old plants, and it pays to obtain a larger number than is actually needed and then discard all of the smaller ones.

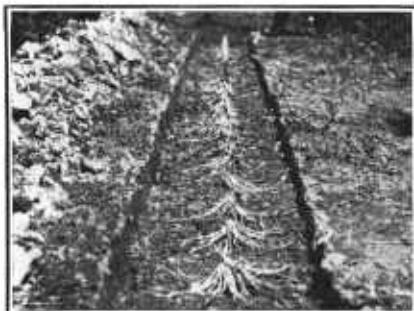


FIGURE 1.—Asparagus crowns or plants being set in a trench.

CULTIVATION

The asparagus bed should be given clean cultivation from the very start and a vigorous growth encouraged. After the bed has reached its second year and the cutting of the young shoots has begun, the bed should be kept free from weeds by hand weeding until the end of the cutting period, then given a thorough renovating with the hoe and the shoots allowed to develop tops. A top dressing of about 2 inches of rotted manure and a very little commercial fertilizer should be given at the close of the cutting period. It should be borne in mind that during the summer the plants store food in their roots with which to produce the spring crop of succulent shoots, and it is essential that they have plenty of plant food to build upon. Weeds and grass may be smothered during the latter part of the season by mulching the bed with coarse manure.

Late in the summer or early autumn, when the asparagus tops begin to turn yellow and die, the tops can be cut off just above the ground and removed. This will give an opportunity for thoroughly renovating the bed and getting rid of all weeds or grass and will check rust. In the South, Bermuda grass is very difficult to control if it ever gets started in the asparagus bed.

INSECTS

The asparagus beetle may greatly injure the growth of the plants during the late spring and summer months. The eggs of this insect are laid in clusters on the young shoots, and these soon hatch into small dark-colored grubs that feed upon the tender growth. To destroy the grubs, dust the plants at intervals during the summer while the dew is upon them, with lead arsenate mixed with four or five times its volume of air-slaked lime. Another remedy is to spray the plants with a solution consisting of 10 level teaspoonfuls of the powdered form of lead arsenate in 3 gallons of water. In preparing this spray care must be taken to mix the poison thoroughly with the water; also to apply it in the form of a fine spray, so that all parts of the plants will be covered.

USES OF ASPARAGUS

The young tender shoots of asparagus, as they spring from the crowns and appear at the surface during the early spring, are the parts used. (Fig. 2.) Shoots should be cut every day during the season of rapid growth, and none should be allowed to remain to develop tops, as a crown will stop producing new shoots as soon as tops have been allowed to grow on it.

Use a sharp chisel-shaped knife to cut the shoots below the surface. The shoots should be cut while crisp and tender, before the bud or tip begins to unfold. If it is desired to have blanched asparagus, 5 or 6 inches of loose soil may be heaped over the hills; then the shoots may be cut about 6 inches below the surface just as soon as the tips break through.

Any surplus asparagus tips not wanted for immediate use may be canned.

RHUBARB

Rhubarb, sometimes called pieplant, is not adapted to the Southern States, but only to that part of the country having a moderate rainfall and where the ground freezes to a depth of 4 inches or more during the winter. It is scarcely necessary to mention that the leaf stem is the part used and that the way to use it is in pies, or better, in the form of sauce. Rhubarb possesses fine dietetic qualities.

The same cultural directions given for asparagus will serve for rhubarb, except that only five or six hills (fig. 3) will be needed to supply the average family, and the hills should be spaced much farther apart than for asparagus. The varieties known as Linnaeus and Victoria are most commonly grown. As a rule, a few hills of rhubarb are planted along the garden fence, where it will be out of the way.

The usual method of starting the plants is to obtain pieces of root from established hills and simply set them in soil that has been deeply spaded and heavily manured. The sills should be at least 4 feet apart and the roots set 3 or 4 inches below the surface. The hills should be fertilized each year, the same as for asparagus. No stems should be pulled from the hills until the second year, and comparatively few should be pulled before the third season. The hills of rhubarb should be divided and reset in about seven years, or they will become too thick and produce slender stems. The flower or seed stalks should be pulled out when they appear.

The stems of the rhubarb leaves are frequently stung by an insect; however, this does not often occur until after the spring season, and very little harm results. Rhubarb is also troubled with one or two diseases, but up to the present these have not interfered to any serious extent with the growing of rhubarb in the home garden.

HORSERADISH

Grated horseradish is a very desirable condiment during the winter months, and it is always best when fresh. A few hills of horse-



FIGURE 2.—Washington asparagus in proper condition for use.

radish (fig. 4) planted in an out-of-the-way place in the garden will supply the table. The plants are easily started from pieces of older roots about the size of a lead pencil, or a little larger, and 6 to 8 inches in length. When the horseradish is dug in the autumn, the



FIGURE 3.—A good hill of rhubarb.

slender roots are removed, stored in a box of moist sand, and buried outdoors, or kept in a cool cellar until spring. The large roots intended for use can be kept in the same manner. Before the root cuttings are planted, the ground should be spaded to a depth of about 12 inches and plenty of well-rotted manure or fertilizer worked into the soil. A trench 4 or 5 inches deep is opened with a hoe, and the root cuttings are placed at an angle, with their tops near the surface

of the ground. Each root cutting will sprout in several places and form a number of tops. After these are well established, the soil should be carefully removed by hand from around the cuttings, and all but one good heart near the top of the cutting removed. The earth should then be replaced around the root and drawn up well about this remaining top to support it. If the ground is rich the roots will be ready for use the following autumn. As a rule the plants in the home garden are not reset each year, but simply al-



FIGURE 4.—Horseradish, first season from cuttings.

lowed to grow in a greater cluster and the roots removed as needed for use. This method, however, does not give as large or as tender roots as where the plants are set each year. Horseradish is like

asparagus in that it requires rich soil and plenty of moisture. It will not grow well on land that is poorly drained.

SMALL FRUITS

RASPBERRIES

There are three types of raspberries, according to color of fruit—the red, the black, and the purple. The red type differs from the



FIGURE 5.—Raspberries grown in a home fruit garden.

others in its habit of growth and in its method of forming new plants. The canes of the red type do not usually branch much, but the black and purple varieties branch considerably, especially if the tips are pinched out of the young shoots when they are $1\frac{1}{2}$ to 3 feet high. (Fig. 5.)

THE RED TYPE

The red type is propagated by suckers—that is, new shoots coming from underground rootstocks. Each shoot and its attached piece of root make a new plant. Some good varieties for general use are the Cuthbert, Latham, Chief, Newburgh, and Ranere (*St. Régis*). The Ranere bears an early summer crop closely following strawberries, and if the new shoots are not cut back in the summer or fall it bears a late fall crop also.

THE BLACK AND PURPLE TYPES

The black and purple types are propagated by the tips of the branches touching the ground and forming roots. This is done in

the late fall. To get a new plant, cut the rooted branch a few inches above the ground and dig out the rooted part. Among the good black varieties are the Cumberland, Plum Farmer (*Farmer*), and Kansas.

For home use the purple varieties are very desirable, because the plants are extremely vigorous and productive and the fruits are large, juicy, and of good quality. The berries are dull purple and rather unattractive in color, and are not always popular on the market unless they are well known. The Potomac is the best variety.

PLANTING

For planting raspberries, trim the long roots back to about 6 inches and cut off the broken ends of short roots. Dig holes or plow furrows deep enough and wide enough to take in the roots without crowding, set the plants 1 or 2 inches deeper than they were before being dug, and fill in and tramp down the earth until the hole is filled. Cut the tops back to 1 inch or less to remove any stem disease present.

Set the plants 3 feet apart in the row and have the rows 6 to 8 feet apart.

PRUNING, TRAINING, AND CULTIVATING RASPBERRIES

During the first year no pruning is necessary unless a very heavy growth is made, and then only the growing tips of the black and purple varieties will need to be cut or pinched off when they reach a height of 1½ to 3 feet. These new canes of the first year ought to bear fruit the second year. Only the 1-year-old canes bear fruit, and since these die after producing one crop, they, and also all weak shoots, should be cut out as soon as possible after the crop is gathered, so as to let all the strength of the plants go into growing strong new shoots for next year's fruiting. Cut the tips off the new shoots of the black and purple varieties when they are about 1½ or 2½ feet high and they will branch and become stocky. In the spring cut the side branches back to 10 or 12 inches and the tops to about 4 feet if they are taller than that, and take out all weak shoots. Leave from five to eight shoots to each plant. If the old canes were not taken out after fruiting, get them out early in the spring before growth begins.

The red varieties do not need as much pruning as the others. Cut out all fruiting canes after the crop is gathered, and if the new shoots grow 5 or 6 feet high cut back the tops to about 4 feet in the following spring before growth starts. If a great many new shoots come up, pull out all but those needed for the row.

To train raspberries, either drive a stake by each plant and tie the shoots to it or build a wire trellis to support the shoots. The trellis may be made of one row of posts 3 feet high, with cross arms perhaps 2 feet long nailed to the tops and a No. 10 galvanized wire run lengthwise along each side of the row, fastened near each end of the cross arm, or by setting a row of posts the same height along each side of the row and fastening the wires to the tops of the posts.

Apply a dressing of rotted manure each spring if the ground is not rich enough to cause a vigorous growth, and give raspberries good cultivation throughout the season. After good cultivation for

a year or two the ground may be permanently mulched with waste hay, straw, or vegetable rubbish to take the place of cultivating and weeding.

CLEANING UP OLD RASPBERRY PATCHES

If the berry patch has been running wild, but is worth saving, cut out all the dead and weak canes and plow and cultivate the spaces between the rows. If the plants are thick in the row, dig out enough so those of the black and purple varieties left will be about 2 or $2\frac{1}{2}$ feet apart with five to eight canes per plant. Plants of the red varieties may be left a foot or more apart in a kind of hedgerow. Prune these, as mentioned in another paragraph, and run a wire along each side supported on stakes or on a row of posts with 3-inch strips of wood 15 inches long nailed to the posts.

WINTER PROTECTION

In very cold sections where there is little or no snow covering, especially where there are cold, dry winter winds, it is necessary to give all berry bushes some protection. This is best done by gently bending down the plants all one way lengthwise of the row and covering them with a few inches of earth. In large patches this may be done by plowing a furrow over the row from each side and then finishing the covering with a shovel if necessary. In the spring uncover the plants and straighten up the canes.

BLACKBERRIES

New plants of blackberries grow as suckers from the roots just like red raspberries or from pieces of roots 3 to 4 inches long planted 2 or 3 inches deep in the spring. The planting, pruning, cultivating, mulching, trellising, winter protection, and general care of blackberries are the same in all respects as for black and purple raspberries. Set the plants 3 feet apart in rows 6 to 8 feet apart. Keep the suckers pulled or dug out and leave only three or four of the strongest canes on each plant. Some good varieties are Mercereau, Blowers, and Eldorado. Snyder is very hardy for the North. (Fig. 6.)

LOGAN, YOUNG, AND BOYSEN

The Logan blackberry is a trailing type which resembles the dewberry in its habits of growth and in forming new plants by the tips of the canes sending roots into the ground. It is a very strong grower, sometimes producing canes 20 feet or more long.

This berry should be planted only in the mild sections of the Pacific Coast States. It will not survive cold winters and does not seem able to adapt itself to conditions away from the Pacific coast.

For garden use, set the plants in the spring 6 feet apart in rows 6 to 8 feet apart. Let the new canes trail over the ground the first year. During the second spring, either drive a strong stake by each plant, wrap the canes around it, and tie with soft twine in three places, or build a trellis with two or three wires and tie the canes to the wires.

After the fruit is picked, cut out the old canes and tie up the new ones. If the new canes grow too long, cut them back to any desired length. Give the same general care required by blackberries.

The Young dewberry (Youngberry) is rapidly replacing the Logan as it is higher in dessert quality and better adapted to home uses. It is adapted to the Pacific coast and to eastern States from Virginia and Arkansas to Georgia and Texas. The Boysen is a still larger berry of the Young type and is adapted to the same regions. These berries should be trained like the Logan blackberry or the other dewberries.

DEWBERRIES

Dewberries are similar to blackberries in most respects except that the canes creep along the ground and form new plants by rooting at the tips. Set plants of Austin, Mayes, and Lucretia 3 feet apart in



FIGURE 6.—Blackberries the second season after planting.

rows 5 to 6 feet apart, or 5 feet apart in rows 5 feet apart if cultivation is to be given both ways.

Set out the plants in early spring and give good cultivation throughout the season. Let the canes lie on the ground the first year. Drive a stake 5 or 6 feet long at each hill the next spring or build a one- or two-wire trellis to support the canes. If stakes are used, wrap the canes once or twice around them and tie in two or three places with soft twine. If a wire trellis is used, tie the canes along the wires.

Dewberries are pruned much like other berries. Cut out the old canes after fruiting and clip back the new growth if the canes grow longer than 5 or 6 feet. Leave about six canes on each plant. In

the cold parts of the country the canes must be laid down and covered with earth, straw, or other material for winter protection. This protection is removed in the spring, and the canes are then tied to the stakes or wire trellis. The Young dewberry is adapted for growing in the South and on the Pacific coast, but it winterkills in the North. The Austiu and Lucretia are old standard varieties.

CURRENTS

Do not try to grow currants in sections where the white pine flourishes, because a very destructive disease of this pine lives and thrives on these bushes.

Currants are propagated by cuttings or by rooted shoots from well-established plants. Cuttings, 8 to 10 inches long, of well-ripened twigs are taken in the fall and planted up to the top bud in well-prepared soil, or they may be tied in bundles and kept slightly moist in sand in a cold place until spring and then planted.

VARIETIES OF CURRENTS

Currants come in three colors—red, white, and black. The black ones have a rather strong characteristic flavor which many people do not like. The red fruit is most popular, although the white is just as good. Four good red varieties are Red Lake, Red Cross, Perfection, and Pomona. The White Grape is a good white variety.

PLANTING, PRUNING, AND CULTIVATING CURRENTS

For home use a few bushes, such as the one shown in Figure 7, are sufficient. Set the red and white varieties 4 or 5 feet apart and the black ones 6 to 8 feet apart. Very little pruning is needed until the shoots begin to crowd; then cut out the weak and oldest ones and cut back any long, straggling growths. Leave 8 or 10 strong shoots to each plant. Currants are usually planted along one side of the garden and are then neglected. They ought to be given good cultivation and manure or fertilizer, as mentioned for raspberries. They will endure shade if they must, but full sunlight is desirable.



FIGURE 7.—Currant plant, 2 years after setting.

GOOSEBERRIES

Gooseberries are propagated by cuttings or rooted shoots, like currants, and also by mound layering, but they should not be planted

in sections where the white pine flourishes, as they, like currants, are hosts to a very destructive disease of that tree. In mound layering the tops are cut off in the early spring, leaving stubs 4 or 5 inches long. Many new shoots will grow from these stubs, and when they are hardening a little in early summer cover the lower 4 or 5 inches of these shoots with a mound of earth. Each shoot will then send out roots, thus forming an independent plant. The earth is taken away in the fall and the young rooted plants cut off and either planted or kept slightly moist in earth or moss in a cool place until spring. Gooseberries need the same care and cultivation as currants, but should be planted 6 feet apart. The English varieties bear large to very large fruits, but they do not always succeed well, on account of mildew, so it is usually best to plant the smaller American varieties, such as Downing, Poorman, Van Fleet, and Glenndale. Oregon Champion is best for the Pacific Northwest. Industry is the name of a good English variety.

STRAWBERRIES

The strawberry is so easily handled and requires so little room that if only one of the small fruits can be grown it should be the one



FIGURE 8.—Hill of everbearing strawberries.

selected. New plants may be purchased at small cost from a nurseryman, or perhaps may be obtained free from a neighbor.

SYSTEMS OF CULTURE

The strawberry plant may be grown in hills or in narrow or wide matted rows. For very small areas, plants set in hills close together, as shown in Figure 8, will no doubt produce the most and largest

fruit, but will require more care than matted rows. For hill growing, set the plants 1 foot apart in the row and have the rows just far enough apart to cultivate easily, say from 2 to 3 feet; or set two rows a foot apart in double rows and have a space of 2 or 3 feet between the double rows. Keep all runners cut off and give good cultivation, so as to make extra-strong plants. Some of the choicest varieties for hill culture are the Marshall, Chesapeake, Dorsett, and Fairfax, of the single-crop kind, and the Gem, Rockhill, and Green Mountain, of the everbearing varieties. The everbearing varieties are considered most satisfactory for hill culture.

To start matted rows, set the plants 18 inches apart in rows from 3 to 4 feet apart. For a narrow matted row, as shown in Figure 9, train the first runners along the row, covering about a foot in width, and cut off all later runners. From four to six new plants from each plant set will make a narrow row. For wide matted rows, save enough new plants to make the row 2 feet wide, or more, as desired. Do not let the plants crowd each other; have them 8 or 9 inches apart.



FIGURE 9.—Strawberries growing in matted rows.

SETTING THE PLANTS

Set the strawberry plants early in the spring, if possible, so they will get the benefit of spring rains and make a strong early growth. Trim off the dead leaves and all but one or two of the live ones and cut the roots to about 4 or 5 inches long. Spread the roots somewhat

and set the plants just as deep in the soil as they were before they were dug. Be especially careful not to set them deeper and not to get earth over the growing crowns, for this will probably kill the plants.

The newly formed plants are sometimes set with success in summer or early fall if they are given special care and watering. If they can be taken up with balls of earth on their roots, transplanting ought to be successful. Young plants grown in pots may be transplanted with perfect success. To grow these potted plants, use 2-inch plant pots filled with soil well packed down, and sink a pot in the ground beneath each new runner plant, so it will send its roots into the soil in the pot. Transplant these to the garden whenever they are well rooted. To get a plant out of the pot, hold it upside down and tap one side of the rim gently on wood to loosen the earth from the pot and cause it to come out unbroken. Water the plants as soon as set and whenever necessary later.

CULTIVATING AND MULCHING

Give newly set strawberries frequent cultivation and hoeing during the entire season to keep down the weeds and make strong plants for fruiting the next year. Pick off all blossom buds which appear except in the case of fall-bearing varieties, on which some blossoms may be left after August 1 to fruit in the fall. When the ground freezes cover the plants or the entire bed with about 2 inches of straw or other vegetable matter free from weed seeds. Coarse strawy manure, with the fine portions shaken out, is excellent for this purpose. The object of this winter covering is to keep the ground from freezing and thawing with each change of temperature, because this freezing and thawing will slowly lift the plants out of the ground. When growth starts, rake the covering off the plants and leave it between the rows.

In the spring when the plants begin to blossom spread nitrate of soda along each side of the row, using 1 pound to 80 feet of row. If the ground has not been mulched, cultivate and then mulch with straw, marsh hay, or pine needles between the rows, so as to conserve the moisture from the spring rains. Work the mulch around the plants to protect the fruit from dirt.

CARE AFTER FRUITING

If the bed is to be saved for another year, rake off the mulch as soon as the crop is gathered, and hoe or pull out the older plants, leaving only enough of the young ones to send out runners to make a new narrow or wide matted row, as desired. If the leaves on the plants left are spotted with disease, cut or mow them off and burn them. A pound of nitrate of soda per square rod of ground scattered around the plants will start a vigorous growth. Put this on when the plants are dry, for it will injure any damp parts of the plants it touches. Handled in this way a bed may be kept for several years, because the new plants of one year are saved for fruiting the next.

Old beds may be cleaned up, as just mentioned, by hoeing or plowing the spaces between rows and leaving the youngest plants in the row.

VARIETIES OF STRAWBERRIES

There are several varieties of strawberries which bear a spring crop and a late summer and fall crop. These are called everbearing varieties and are desirable for the home garden especially in the northern sections. To have a big fall crop, set the plants in the spring, cultivate well, and pick off all blossoms until late July or August. These will bear fruit up to the time of quite heavy frosts and will bear again in the spring, after which they may be discarded. Set new plants of the everbearing varieties each spring for the fall crop of fruit, because these give better results than plants in the old bed. The Rockhill, Gem, and Green Mountain are good fall-bearing varieties.

Of the single-crop varieties the Missionary, Southland, and Blakemore are best for the Southern States. Marshall, Corvallis, Narcissus, and Redheart are best for the Northwestern States. For the rest of the country, the Premier (*Howard 17*), Dorsett, Fairfax, Dunlap, Chesapeake, Catskill, and Gandy are best and will cover the whole strawberry season. All of these varieties have perfect blossoms. Redheart is especially good for canning.

PERFECT AND IMPERFECT BLOSSOMS

Strawberry blossoms are of two kinds.. One kind is called "perfect", "stamineate", or "male", and the other kind is "imperfect", "pistillate", or "female." Some varieties have perfect blossoms and other varieties have imperfect blossoms. Those with perfect blossoms produce pollen which will fertilize both perfect and imperfect blossoms and cause them to bear fruit. The varieties with imperfect blossoms cannot set fruit without receiving pollen from perfect blossoms.

Do not plant varieties having imperfect blossoms without also planting at least one perfect-blossom variety to pollinate them. One row with perfect blossoms will pollinate four rows with imperfect blossoms.

The nurserymen's catalogs, State agricultural experiment station bulletins, and United States Department of Agriculture publications always specify whether a variety has perfect or imperfect blossoms.

GRAPES¹

PROPAGATING VINES

Grapes are usually propagated by cuttings of the last year's growth of canes; these are made in late fall or early spring and should be two or three buds long. Keep them in slightly moist sand in a cool place until they are planted. Dig a trench about 10 or 12 inches deep and set the cuttings 4 inches apart, either straight or slanting, in the trench and fill in and pack down the soil around them. Give good cultivation and water if necessary during the season. Dig these when 1 or 2 years old for planting in the garden. If plants must be bought, get those 2 years old, if possible.

¹ For information regarding grape varieties see U. S. Department of Agriculture Farmers' Bulletin 1689, Grape Districts and Varieties in the United States.

PLANTING THE VINES

Before planting the vines cut off all the top except one stub with two or three buds and trim the roots to about 4 or 5 inches long.

Set the vines 10 feet apart in the row, and if there are two or more rows have them 10 feet apart to give room for cultivating and spraying. Dig the holes a foot or more deep and about 15 inches across. Hold the vine in position and fill in and pack the soil around the roots, setting the plant just as deep as it was before it was dug.

Grapevines may be planted along the garden fence and trained on the fence, if desired. They may be trained on supports along buildings, if placed where they will be shaded not more than a few hours each day. They may also be trained over the top of sheds, garages, or other small buildings.

Currants, gooseberries, or strawberries may be grown between the rows of grapes, if desired. Strawberries may be grown in the row between the grapevines when the Munson system of training is used.

CULTIVATION

Keep the ground well cultivated and all weeds killed. As soon as soil is dry enough after heavy rains, stir it with a cultivator or hoe.

PRUNING YOUNG VINES

During the first year, let the new canes trail over the ground at will. The canes which make a strong enough growth are to be saved, one cane to the plant, to form the trunk canes. Early the next spring cut the tops off the trunk canes, from 30 to 54 inches high, depending upon the system of training to be used. Also cut off the side branches, if there are any on these trunk canes. Drive a stake into the ground by each plant and tie the trunk cane to it. During the second year the fruiting arms will grow from the trunk cane.

If the plants make only a small growth the first year, cut off all the top except one stub of two or three buds the next spring, let the strongest bud grow into a trunk cane, and handle as mentioned in the paragraph above.

Decide upon the kind of trellis wanted and build it before the third year's growth begins.

PRUNING FRUITING VINES

Prune fruiting vines in the late fall or early spring. There are two methods of pruning fruiting vines, the renewal and the spur systems. In renewal pruning all the previous year's growth is cut off except the two or four canes to be saved for the fruiting arms. In the two-arm system the best arm nearest the trunk on each side is left, and in the four-arm system two high and two low arms are left in the same way.

In spur pruning, the fruiting arms are left year after year, and the previous year's shoots on these arms are cut back to spurs of one or two buds. There may be either two or four arms, as in renewal pruning.

Either renewal or spur pruning may be done with the different systems of training. The renewal method has the advantage, in that no old wood except the trunk cane is left.

SYSTEMS OF TRAINING

Of the many systems of training grapevines, only four of the best will be described here. Usually only two or four fruiting canes or arms are left to bear the crop of fruit.

High renewal system.—In the high renewal system two fruiting arms are allowed to grow low on the trunk cane, and they are tied

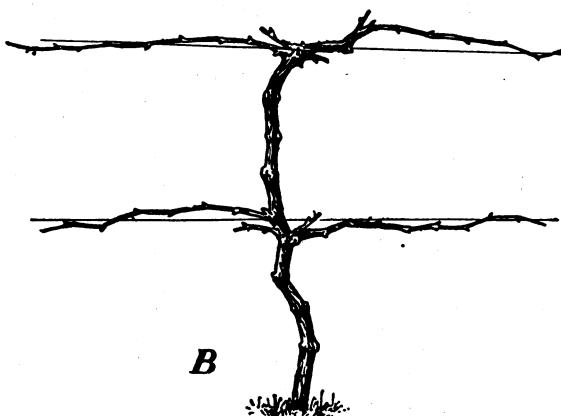
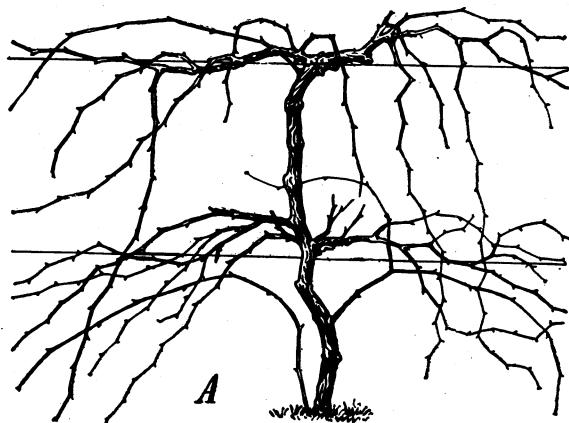


FIGURE 10.—*A*, An unpruned vine; *B*, the same vine pruned according to the 4-arm renewal system.

to the lower wire. These arms are renewed each year by saving the best arm nearest the trunk on each side and cutting off the old arms and all other growth. The arms saved are cut back to 8 or 10 buds, and this renews the bearing wood each year. When the new shoots

from the bearing arms are long enough, they are tied to the upper wire for support.

Horizontal-arm spur system.—The horizontal-arm spur system is like the one just described, except that the two fruiting arms left year after year and the shoots on them are cut back every spring to spurs with one or two buds. The new shoots are tied to the upper wire for support.

Four-arm renewal system.—In the 4-arm renewal system four fruiting arms are left, two on the lower and two on the upper wire. (Fig. 10.) These are pruned and renewed exactly as described under the high renewal system above, and are tied to the wires. The new shoots from these fruiting arms are usually not tied; they



FIGURE 11.—Grapevines trained by the modified Munson system.

grow naturally without support. This is a good system for strong-growing varieties.

Modified Munson system.—The modified Munson system is one of the best for both productiveness and ease of handling the vines. The trunk cane reaches to the wire about 54 inches above the ground and has two fruiting arms, one tied to the wire in each direction. (Fig. 11.) As the new shoots grow they droop over the wires supported at the ends of the crossbars. The fruit is easily and quickly sprayed and gathered when trained by this system.

THE GRAPE TRELLIS

The ordinary trellis is built of No. 10 or 12 galvanized wires stapled to strong posts set securely 5 feet or more out of the ground and spaced 16 to 20 feet apart. If two wires are used, place them

30 and 56 inches above the ground. If three wires are used, place them 20, 40, and 56 inches above the ground.

The modified Munson system of training grapes is fine for home use. At the top of posts 5 feet high crossbars 2 feet long are nailed. Two wires extend lengthwise of the row, one being stapled on each side along the ends of the crossbars. The third wire is either stapled to the posts or run through holes bored through them 6 inches below the top of the posts. The fruiting arms are tied along this lower wire, and the new growing shoots droop gracefully over the other wires, which support them without any tying.

If the garden is large enough for it a grape arbor will be a pleasing addition to the permanent garden, or it may lead from the house to the garden. The grape arbor is usually 8 feet or more wide and as long as desired. Strong posts 9 or 10 feet long are set securely 2 or 3 feet deep and 10 or 12 feet apart. Either wires or 1 by 2 inch wooden strips are nailed along the outside of each row of posts at 30, 48, and 66 inches above the ground. If the top of the trellis is to be flat, nail 2 by 4 wooden crosspieces to opposite posts and fasten wires or 1 by 2 inch wooden strips 15 inches apart lengthwise of the arbor. If the top is to be of even-span roof shape, nail 2 by 4 inch wooden plates on the top of each row of posts and fit rafters to these; fit them directly over the tops of the posts. Fasten wooden strips or wires 15 inches apart to the rafters lengthwise of the arbor. In a very large garden an arbor or a pavilion of summerhouse type may be made the central feature.

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